

FIG. 1, native human IL-13 (SEQ ID NO. 1)

G P V P P S T A L R E L I E E L V N I T Q N Q K  
A P L C N G S M V W S I N L T A G M Y C A A L E  
S L I N V S G C S A I E K T Q R M L S G F C P H  
K V S A G Q F S S L H V R D T K I E V A Q F V K  
D L L L H L K K L F R E G R F N \*

FIG. 2, native murine IL-13 (SEQ ID NO. 2)

G P V P R S V S L P L T L K E L I E E L S N I T Q  
D Q T P L C N G S M V W S V D L A A G G F C V A  
L D S L T N I S N C N A I Y R T Q R I L H G L C  
N R K A P T T V S S L P D T K I E V A H F I T K  
L L S Y T K Q L F R H G P F \*

FIG. 3, Alignment of several mammalian IL-13 sequences

|       | * | 20                    | *   | 40 | *  | 60 | *            |
|-------|---|-----------------------|---|----|----|----|--------------|
| HUMAN | : | GPVPP-----            | STALRELIEELVNITQNQKAPLCNGSMVWSINLTAGM-YCAALES | LN | SV | GC | SAIEKTQRM    |
| PIG   | : | GPVPPH-----           | STALKELIEELVNITQNQKTPLCNGSMVWSVNLTSMQYCAALES  | LN | IS | DC | SAIQKTQRM    |
| BOVIN | : | SPVPS-----            | ATALKELIEELVNITQNQKVPLCNGSMVWSNLTSSM-YCAAL    | DS | LI | SI | SNCSVIQRTKKM |
| DOG   | : | SPVTP-----            | SPTLKEIEELVNITQNQ-ASLCNGSMVWSVNLTAGM-YCAALES  | LN | SV | DC | SAIQRTQRM    |
| MOUSE | : | GPVPRSVSLPLTLKELIEELS | NITQDQ-TPLCNGSMVWSVDLAAGG-FCVAL               | DS | LT | NI | SNCNAIYRTQRI |
| RAT   | : | GPVRRSTSPVALRELIEELS  | NITQDQKTSLCNSMWSVDLTAGG-FCAALES               | LT | NI | SS | CNAIHRTQRI   |

  

|       | 80 | *                   | 100 | *                 | SEQ ID NO.1 |
|-------|----|---------------------|-----|-------------------|-------------|
| HUMAN | :  | LSGFCPHKVSAGQFSS    | LHV | RTKIEVAQFVKDLLHLK | KL          |
| PIG   | :  | LSALCSHKPPSEQVPGKH  | IRD | TKIEVAQFVKDLLKHL  | RMIFRHG---  |
| BOVIN | :  | LNALCPHKPSAKQVSSEY  | VRD | TKIEVAQFLKDL      | L           |
| DOG   | :  | LKALCSQKPAAGQISSERS | RD  | TKIEVIQLVKNLLTY   | VRGVYRHGNFR |
| MOUSE | :  | LHGLCNRKAP-TTVSS--  | LPD | TKIEVAHFITKLLSY   | TKQLFRHGP   |
| RAT   | :  | LNGLCNQKAS-DVASS--  | PPD | TKIEVAQFISKLLINYS | SKQLFRYGH-- |

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FIG. 4, IL-13 sequences from non-human primates

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1 S P V P P S T A L K E L I E E L V N I T  
1 S P V P R S T A L K E L I E E L V N I T  
1 G P V P P Y T A L K E L I E E L V N I T

15

21 Q N Q K A P L C N G S M V W S I N L T A  
21 Q N Q K A P L C N G S M V W S I N L T A  
21 Q N Q K A P L C N G S M V W S I N M T A

20

41 G V Y C A A L E S L I N V S G C S A I E  
41 G V Y C A A L E S L I N V S G C S A I E  
41 G V Y C A A L E S L I N V S G C S A I E

25

61 K T Q R M L N G F C P H K V S A G Q F S  
61 K T Q R M L N G F C P H K V S A G Q F S  
61 K T Q R M L S G F C P H K V S A G Q F S

81 S L R V R D T K I E V A Q F V K D L L V  
81 S L R V R D T K I E V A Q F V K D L L V  
81 S L L V R D T K I E V A Q F V K D L L R

30

101 H L K K L F R E G Q F N . cynomolgus IL13 SEQ ID NO.7  
101 H L K K L F R E G R F N . rhesus IL13 SEQ ID NO.8  
101 H L R K L F H Q G T F N . marmoset IL13 SEQ ID NO.9

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FIG. 5, Immunogen 1 (protein SEQ ID NO. 10, coding DNA SEQ ID NO. 62, non-coding DNA SEQ ID NO. 63)

5  
10  
15  
20  
25  
30  
35

1  
61  
121  
181  
241  
301

GGCCCTGTGCCTCCCTCTAGCGCCCTCAAGGAGCTCATTGAGGAGCTGGCCAACATCACC  
-----+-----+-----+-----+-----+  
CCGGGACACGGAGGGAGATCGCGGGAGTTCCCTCGAGTAACTCCTCGACCGGTTGTAGTGG  
G P V P P S S A L K E L I E E L A N I T  
CAGAACCAGAAGGCTCCGCTCTGCAATGGCAGCATGGTATGGAGCATCAACCTGACAGCT  
-----+-----+-----+-----+-----+  
GTCTTGGTCTTCCGAGGCGAGACGTTACCGTCGTACCATACCTCGTAGTTGGACTGTCTGA  
Q N Q K A P L C N G S M V W S I N L T A  
GGCATGTACTGTGCAGCCCTGGACTCCCTGATCAACGTGTCAGGCTGCAGTGCCATCGAG  
-----+-----+-----+-----+-----+  
CCGTACATGACACGTCGGGACCTGAGGGACTAGTTGCACAGTCCGACGTCACGGTAGCTC  
G M Y C A A L D S L I N V S G C S A I E  
CGGACCCAGAGGATCTTGAGCGCCTTCTGCCCGCACAAGGTCTCAGCTGGGCAGTTTTTC  
-----+-----+-----+-----+-----+  
GCCTGGGTCTCCTAGAACTCGCGGAAGACGGGCGTGTTCAGAGTCGACCCGTCAAAGG  
R T Q R I L S A F C P H K V S A G Q F S  
AGCTTGCGTGTCCGAGACACCAAAATCGAGGTGGCCAGTTTGTAAACGGACCTGCTCGTA  
-----+-----+-----+-----+-----+  
TCGAACGCACAGGCTCTGTGTTTTAGCTCCACCGGGTCAAACATTGCCTGGACGAGCAT  
S L R V R D T K I E V A Q F V T D L L V  
CATTAAAGAGACTTTTTTCGCCAGGGAACGTTCAAC  
-----+-----+-----+-----+-----+  
GTAAATTTCTCTGAAAAAGCGGTCCCTTGCAAGTTG  
H L K R L F R Q G T F N

60  
120  
180  
240  
300  
336

FIG. 6, Immunogen 2 (SEQ ID NO. 11),

5 G P V P P S T A L R E L I E E L V N I T Q  
 N Q K A P L C N G S M V W S I N L T A G M  
 Y C A A L E S L I N V S G C S A I E K T Q  
 R M L G G F C P H K F N N F T V S F W L R  
 V P K V S A S H L E D T K I E V A Q F V K  
 D L L L H L K K L F R E G R F N

10

FIG. 7, Immunogen 3 (SEQ ID NO. 12)

F N N F T V S F W L R V P K V S A S H L E  
 G P V P P S T A L R E L I E E L V N I T Q  
 15 N Q K A P L C N G S M V W S I N L T A G M  
 Y C A A L E S L I N V S G C S A I E K T Q  
 R M L G G F C P H K V S A G Q F S S L H V  
 R D T K I E V A Q F V K D L L L H L K K L  
 F R E G R F N

20 FIG. 8, Immunogen 4 (SEQ ID NO. 13)

G P V P R S V S L P L T L K E L I E E L S  
 N I T Q D Q T P L C N G S M V W S V D L A  
 A G G F C V A L D S L T N I S N C N A I Y  
 R T Q R I L H G L C N R K F N N F T V S F  
 25 W L R V P K V S A S H L E D T K I E V A H  
 F I T K L L S Y T K Q L F R H G P F

FIG. 9, Immunogen 5 (SEQ ID NO. 14)

F N N F T V S F W L R V P K V S A S H L E  
 30 G P V P R S V S L P L T L K E L I E E L S  
 N I T Q D Q T P L C N G S M V W S V D L A  
 A G G F C V A L D S L T N I S N C N A I Y  
 R T Q R I L H G L C N R K A P T T V S S L  
 P D T K I E V A H F I T K L L S Y T K Q L  
 35 F R H G P F

FIG. 10 Immunogen 6 (SEQ ID NO. 15)

F N N F T V S F W L R V P K V S A S H L E  
 40 G P V P R S V S L P V T L K E L I E E L T  
 N I T Q D Q T P L C N G S M V W S V D L A  
 A G G F C V A L D S L T N I S N C N A I F  
 R T Q R I L H A L C N R K A P T T V S S L  
 P D T K I E V A H F I T K L L T Y T K N L  
 F R R G P F

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FIG 11, Immunogen 7 (protein SEQ ID NO. 16, DNA SEQ ID NO. 64)

5  
TACGTACATTCCGACGGCTCTTATCCAAAAGACAAGTTTGAGAAAATCAATGGCACTTGG  
-----+-----+-----+-----+-----+-----+-----+  
Y V H S D G S Y P K D K F E K I N G T W

10  
TACTACTTTGACAGTTTCAGGCTATATGCTTGACAGACCGCTGGAGGAAGCACACAGACGGC  
-----+-----+-----+-----+-----+-----+-----+  
Y Y F D S S G Y M L A D R W R K H T D G

15  
AACTGGTACTGGTTTCGACAACCTCAGGCGAAATGGCTACAGGCTGGAAGAAAATCGCTGAT  
-----+-----+-----+-----+-----+-----+-----+  
N W Y W F D N S G E M A T G W K K I A D

20  
AAGTGGTACTATTTCAACGAAGAAGGTGCCATGAAGACAGGCTGGGTCAAGTACAAGGAC  
-----+-----+-----+-----+-----+-----+-----+  
K W Y Y F N E E G A M K T G W V K Y K D

25  
ACTTGGTACTACTTAGACGCTAAAGAAGGCGCCATGCAATACATCAAGGCTAACTCTAAG  
-----+-----+-----+-----+-----+-----+-----+  
T W Y Y L D A K E G A M Q Y I K A N S K

30  
TTCATTGGTATCACTGAAGGCGTCATGGTATCAAATGCCTTTATCCAGTCAGCGGACGGA  
-----+-----+-----+-----+-----+-----+-----+  
F I G I T E G V M V S N A F I Q S A D G

35  
ACAGGCTGGTACTACCTCAAACCAGACGGAACACTGGCAGACAGGCCAGAAGGCCCTGTG  
-----+-----+-----+-----+-----+-----+-----+  
T G W Y Y L K P D G T L A D R P E G P V

40  
CCTCCCTCTAGCGCCCTCAAGGAGCTCATTGAGGAGCTGGCCAACATCACCCAGAACCAG  
-----+-----+-----+-----+-----+-----+-----+  
P P S S A L K E L I E E L A N I T Q N Q

45  
AAGGCTCCGCTCTGCAATGGCAGCATGGTATGGAGCATCAACCTGACAGCTGGCATGTAC  
-----+-----+-----+-----+-----+-----+-----+  
K A P L C N G S M V W S I N L T A G M Y

50  
TGTGACGCCCTGGACTCCCTGATCAACGTGTCAGGCTGCAGTGCCATCGAGCGGACCCAG  
-----+-----+-----+-----+-----+-----+-----+  
C A A L D S L I N V S G C S A I E R T Q

55  
AGGATCTTGAGCGCCTTCTGCCCGCACAAAGGTCTCAGCTGGGCAGTTTTCCAGCTTGCGT  
-----+-----+-----+-----+-----+-----+-----+  
R I L S A F C P H K V S A G Q F S S L R

60  
GTCCGAGACACCAAATCGAGGTGGCCAGTTTGTAACGGACCTGCTCGTACATTTAAAG  
-----+-----+-----+-----+-----+-----+-----+  
V R D T K I E V A Q F V T D L L V H L K

65  
AGACTTTTTTCGCCAGGGAACGTTCAAC  
-----+-----+-----+-----+-----+-----+-----+  
R L F R Q G T F N

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FIG. 12, Immunogen 8 (protein SEQ ID NO. 17, DNA SEQ ID NO. 65)

5 TCCTCTCATTCTTCTAACATGGCGAACACCCAGATGAAGTCCGATAAAATCATCATCGCG  
-----+-----+-----+-----+-----+  
S S H S S N M A N T Q M K S D K I I I A

10 CACAGGGGAGCTAGCGGGTATCTGCCTGAGCACACCCTGGAGTCCAAGGCTCTGGCGTTC  
-----+-----+-----+-----+-----+  
H R G A S G Y L P E H T L B S K A L A F

15 GCCCAGCAGGCTGACTACCTGGAGCAGGACCTGGCGATGACAAAGGATGGCCGCTCGTG  
-----+-----+-----+-----+-----+  
A Q Q A D Y L E Q D L A M T K D G R L V

20 GTGATCCATGACCATTTCTCGACGGACTGACCGACGTCGCCAAGAAGTTCCCCACCGC  
-----+-----+-----+-----+-----+  
V I H D H F L D G L T D V A K K F P H R

25 CATAGGAAGGACGGGAGGTATTACGTGATTGACTTCACCCTCAAGGAGATCCAGAGCCTG  
-----+-----+-----+-----+-----+  
H R K D G R Y Y V I D F T L K E I Q S L

30 GAGATGACCGAGAACTTCGAGACCGGCCCTGTGCCTCCCTCTAGCGCCCTCAAGGAGCTC  
-----+-----+-----+-----+-----+  
B M T E N F E T G P V P P S S A L K E L

35 ATTGAGGAGCTGGCCAACATCACCCAGAACCAGAAGGCTCCGCTCTGCAATGGCAGCATG  
-----+-----+-----+-----+-----+  
I E E L A N I T Q N Q K A P L C N G S M

40 GTATGGAGCATCAACCTGACAGCTGGCATGTACTGTGCAGCCCTGGACTCCCTGATCAAC  
-----+-----+-----+-----+-----+  
V W S I N L T A G M Y C A A L D S L I N

45 GTGTCAGGCTGCAGTGCCATCGAGCGGACCCAGAGGATCTTGAGCGCCTTCTGCCCAC  
-----+-----+-----+-----+-----+  
V S G C S A I E R T Q R I L S A F C P H

AAGGTCTCAGCTGGGCAGTTTTCAGCTTGCGTGTCCGAGACACCAAAATCGAGGTGGCC  
-----+-----+-----+-----+-----+  
K V S A G Q F S S L R V R D T K I E V A

QAGTTGTAAAGGACCTGCTCGTACATTTAAAGAGACTTTTTCGCCAGGGAACGTTCAAC  
-----+-----+-----+-----+-----+  
Q F V T D L L V H L K R L F R Q G T F N

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FIG. 13, Immunogen 9 (protein SEQ ID NO. 18, DNA SEQ ID NO. 66)

5 TTTAATAATTTTACCGTTAGCTTTTGGTTGCGTGTTCCTAAAGTATCTGCTAGTCATTTA  
-----+-----+-----+-----+-----+-----+-----+  
F N N F T V S F W L R V P K V S A S H L

10 GAAGGCCCTGTGCCTCCCTCTAGCGCCCTCAAGGAGCTCATTGAGGAGCTGGCCAACATC  
-----+-----+-----+-----+-----+-----+-----+  
E G P V P P S S A L K E L I E E L A N I

15 ACCCAGAACCAGAAGGCTCCGCTCTGCAATGGCAGCATGGTATGGAGCATCAACCTGACA  
-----+-----+-----+-----+-----+-----+-----+  
T Q N Q K A P L C N G S M V W S I N L T

20 GCTGGCATGTACTGTGCAGCCCTGGACTCCCTGATCAACGTGTGAGGCTGCAGTGCCATC  
-----+-----+-----+-----+-----+-----+-----+  
A G M Y C A A L D S L I N V S G C S A I

GAGCGGACCCAGAGGATCTTGAGCGCCTTCTGCCCCACAAAGGTCTCAGCTGGGCAGTTT  
-----+-----+-----+-----+-----+-----+-----+  
E R T Q R I L S A F C P H K V S A G Q F

25 TCCAGCTTGCGTGTCCGAGACACCAAAATCGAGGTGGCCCAGTTTGTAACGGACCTGCTC  
-----+-----+-----+-----+-----+-----+-----+  
S S L R V R D T K I E V A Q F V T D L L

30 GTACATTTAAAGAGACTTTTTTCGCCAGGGAACGTTCAAC  
-----+-----+-----+-----+-----+-----+-----+  
V H L K R L F R Q G T F N



FIG. 14, Immunogen 10 (SEQ ID NO. 19)

5       TTTAATAATTTTACCGTTAGCTTTTGGTTGCGTGTTTCCTAAAGTATCTGCTAGTCATTTA  
          +-----+-----+-----+-----+  
      F N N F T V S F W L R V P K V S A S H L

10       GAAGGCCCTGTGCCTCCCTCTAGCGCCCTCAAGATTCTCATTGAGGAGCTGGCCAACATC  
          +-----+-----+-----+-----+  
      E G P V P P S S A L K I L I E E L A N I

15       ACCCAGAACCAGAAGGCTCCGCTCTGCAATGGCAGCATGGTATGGAGCATCAACCTGACA  
          +-----+-----+-----+-----+  
      T Q N Q K A P L C N G S M V W S I N L T

20       GCTGGCATGTACTGTGCAGCCCTGGACTCCCTGATCAACGTGTCAGGCTGCAGTGCCATC  
          +-----+-----+-----+-----+  
      A G M Y C A A L D S L I N V S G C S A I

25       GAGCGGACCCAGAGGATCTTGAGCGCCTTCTGCCCCACAAAGGTCTCAGCTGGGCAGTTT  
          +-----+-----+-----+-----+  
      E R T Q R I L S A F C P H K V S A G Q F

30       TCCAGCTTGCGTGTCGAGACACCAAAATCGAGGTGGCCCAGTTTGTAAACGGACCTGCTC  
          +-----+-----+-----+-----+  
      S S L R V R D T K I E V A Q F V T D L L

      GTACATTTAAAGAGACTTTTTCGCCAGGGAACGTTCAAC  
          +-----+-----+-----+  
      V H L K R L F R Q G T F N

FIG 15, Immunogen 11 (SEQ ID NO. 20)

GPVPPSSALKELIEELANITQNQKAPLCNGSMV  
5 WSINLTAGMYCAALDSLINVSGCSAIERTQRIL  
SAFCPHKVSAGQFSSLHV RDTKIEVAQFVTDLL  
VHLKRLFRQGRFN

10

FIG. 16, Immunogen 12 (SEQ ID NO. 21)

GPVPPSTALKELIEELVNITQNQKAPLCNGSMV  
WSINLTAGMYCAALDSLINVSGCSAIERTQRIL  
SAFCPHKVSAGQFSSLRV RDTKIEVAQFVTDLL  
15 VHLKKLFRQGTFN

FIG. 17, Immunogen 13 (SEQ ID NO. 22)

GPVPPSSALREELIEELANITQNQKAPLCNGS  
20 MVWSINLTAGMYCAALES LINVSGCSAIDKT  
QRMLSAFCPHKVSAGQFSSLHV RDTKIEVAQ  
FVKDLLVHLKRLFRDGRFN

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Figure 18, protein SEQ ID NO. 23, DNA SEQ ID NO. 68

5  
1 GGGCCGGTGCCAAGATCTGTGTCTCTCCCTCTGACCCCTAGGGAGCTCATTGAGGAGCTG 60  
G P V P R S V S L P L T L R E L I E E L

10  
61 GTCAACATCACACAAGACCAGACTCCCCTGTGCAACGGCAGCATGGTATGGAGTGTGGAC 120  
V N I T Q D Q T P L C N G S M V W S V D

15  
121 CTGGCCGCTGGCGGGTACTGTGCAGCCCTGGAATCCCTGACCAACATCTCCAATTGCAAT 180  
L A A G G Y C A A L E S L T N I S N C N

20  
181 GCCATCGAGAAGACCCAGAGGATGCTGGGCGGACTCTGTAACCGCAAGGCCCCCACTACG 240  
A I E K T Q R M L G G L C N R K A P T T

25  
241 GTCTCCAGCCTCCCCGATACCAAAATCGAGGTGGCCAGTTTGTAAAGGACCTGCTCAGC 300  
V S S L P D T K I E V A Q F V K D L L S

30  
301 TACACAAAGCAACTGTTTCGCCACGGCCCCCTTCTAA 336  
Y T K Q L F R H G P F \*

35